

Efficient Market Hypothesis and Forecasting of the Industrial Sector on the Indonesia Stock Exchange

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ABSTRACT

The presence of the stock market has helped boost economic growth in Indonesia. However, high levels of volatility plus economic uncertainty make investors need to carry out strategies in investing in the capital market. This study aims to analyze the index movement of each industry sector on the stock exchange in Indonesia by testing the Efficient Market Hypothesis and estimating the growth of returns for each industrial sector. This research uses monthly data from 1996 to 2020 with research methods including variance ratios, data stationarity test, Autoregressive Integrated Moving Average (ARIMA), and Autoregressive Conditional Heteroskedasticity (ARCH). The results showed that the industrial sector on the Indonesia Stock Exchange was inefficient in its weak form. In forecasting, almost all indices experience a contraction of growth at the beginning of the forecasting period. Stakeholders are expected to be more active in the market by buying and selling, especially the contraction of shares. The market has proven to be inefficient in its weak form.

ABSTRAK

Kehadiran pasar saham telah membantu meningkatkan pertumbuhan ekonomi di Indonesia. Namun, tingkat volatilitas yang tinggi ditambah ketidakpastian ekonomi membuat investor perlu melakukan strategi dalam berinvestasi di pasar modal. Penelitian ini bertujuan untuk menganalisis pergerakan indeks setiap sektor industri di bursa saham di Indonesia dengan menguji Hipotesis Pasar Efisien dan memperkirakan pertumbuhan pengembalian untuk setiap sektor industri. Penelitian ini menggunakan data bulanan dari tahun 1996 sampai tahun 2020 dengan metode penelitian meliputi rasio varians, uji stasioneritas data, Autoregressive Integrated Moving Average (ARIMA), dan Autoregressive Conditional Heteroskedasticity (ARCH). Hasil penelitian menunjukkan bahwa sektor industri di Bursa Efek Indonesia tidak efisien dalam bentuk lemah. Dalam peramalan, hampir semua indeks mengalami kontraksi pertumbuhan pada awal periode peramalan. Para pemangku kepentingan diharapkan lebih aktif di pasar dengan membeli dan menjual terutama terjadinya kontraksi saham karena pasar terbukti tidak efisien dalam bentuk lemah.

1. INTRODUCTION

The purpose of establishing a capital market is to support a country's economic growth (Neanidis, 2019; Zhao et al., 2018). The stock market can help other industries to become more developed (Li, 2016; Uygur & Taş 2014). A functioning capital market can increase economic efficiency, investment, and economic growth (Coşkun et al. 2017). A new stock market can boost economic growth by aggregating information about its

prospects, thereby directing capital to investments with high returns (Kudrin & Gurvich, 2015).

The effects of opening a stock exchange show results with increased productivity (Hu & Prigent 2019; Rizvi & Arshad 2016). A new stock exchange can also boost economic growth by reducing ownership of liquid assets and increasing physical capital growth (Chen & Imam, 2013). Uncertainty in the global economy causes many to interpret how stock prices or markets work (Roy & Kemme, 2020).

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One of them is the Efficient Market Hypothesis, a fair-game model indicating that investors are confident with current stock prices that reflect comprehensive information about securities—the expected rate of return based on price impacts the value that is consistent with the risk (Malini, 2019).

Financial markets move dramatically, and stock prices can be too volatile where volatility is an essential phenomenon for financial markets in the world (Jebran et al., 2017; Liu & Yang, 2017). The relationship between volatility and risk is difficult to understand, but stock market volatility is not bad (Byström, 2016). Fundamentally regular instability can form the basis of efficient stock prices (Tuyon & Ahmad 2016). This happens when the dependence of volatility implies predictability received by traders and short-term investors (Audrino et al., 2020). The importance of volatility is widespread in the financial world—equilibrium prices, obtained from the asset pricing model when derivative valuation depends on reliable volatility forecasting (Gu et al., 2020). Portfolio managers, risk arbitrage, and company treasurers see volatility trends, where changes in stock prices can have an impact on investment and risk management (Heywood et al., 2003).

Volatility on the stock exchange also makes stock prices erratic. Three critical events occur on the transaction in a certain period, and these events are bull, bear, and crash (Byström, 2016). The bull market is when an error occurs on the stock market where stock prices rise, production is secure, and employment is wide open (Bouteska & Regaieg, 2018). While the bear market, on the contrary, where stock prices fall, the economy slows, unemployment rises, and inflation is increasing (Bhattarai, 2016). The cause of bulls and bears is the result of supply and demand for securities (Gourène & Mendy, 2018). The market must move in the current direction for a specified period to qualify as a bull and bear.

Barbash (2002) explains that the bull market, bears, and crashes are good, bad, and terrible news. In the bull market, many share prices go up. Many share prices are down in the bear market, whereas a crash is where stock prices go down very quickly. When production grows, and people work and spend money, the market tends to anticipate higher company earnings. At such times, the demand for shares exceeds the supply, which will encourage the growth of share value.

The key to investing successfully in a bull market is to take advantage of rising stock prices, which means buying securities early by paying

attention to the growth in value and selling when it reaches its highest point (Cai & Lu, 2019). It seems simple, but it is not like that, because no one knows when the market will start to rise or have reached its peak. Next, the key to success investing in the bear market has several strategies where investors try to secure their assets in securities with low volatility. Some also take advantage of low stock prices (Frydman & Camerer, 2016).

In the Indonesia context, Agustin (2019) stated that the Indonesia Sharia Stock Index (ISSI) was inefficient in its weak form. Malini (2019) shows an efficient LQ 45 index slightly. Andrianto and Mirza (2016) prove that the Indonesian stock exchange has proven valuable in a weak form. The sample used in the study was the Jakarta Islamic Index (JII), LQ-45, and Kompas 100 in the 2013-2014 period. Guidi and Gupta (2013) proved that the Indonesian capital market was inefficient in a weak form with samples used from January 2000 until April 2011. These results are in line with Hamid et al. (2010) proved that the Indonesian stock market was not efficient in a weak form during the study period from January 2004 to December 2009.

Research related to efficient market hypothesis and forecasting has been done before in other countries such Ahmar and del Val (2020) on the Spanish stock exchange, Sánchez-Granero et al. (2020) on the Latin American stock exchange, Zaman (2019) on the Bangladesh Stock Exchange, Qin & Singal (2015) on the S & P 500 index and shares that were not indexed in the United States, Phan & Zhou (2014) on the Vietnam capital market, Dong et al. (2013) on the global money market index, Hamid et al. (2010) tested an efficient market hypothesis on exchanges in Asia-Pacific countries and Guidi & Gupta (2013) on the stock exchange of ASEAN countries. Sewell (2012) examined the efficient market hypothesis theory on the Dow Jones Industrial Average (DJIA). At the sectoral level, Rajesh et al. (2015) tested the efficient market hypothesis on sectoral indices on the National Stock Exchange in India.

Considering that Indonesia is a developing market and the world is also shifting to industry 4.0, it is essential to carry out the theory of the Efficient Hypothesis Market study and forecasting in the industrial area on the Indonesia Stock Exchange. This research can contribute to determining whether the sectoral industry index on the Indonesia Stock Exchange is efficient and then determine a reasonable investment strategy in this market.

2. THEORETICAL FRAMEWORK AND HYPOTHESES

In the concept of an efficient market, changes in stock security prices in the past cannot be used in estimating future price changes (Tuyon & Ahmad 2016). Changes in stock prices in the market efficiently follow a random walk pattern. The estimation of stock prices cannot be done by looking at the historical prices of these shares, but slightly based on all available information and appearing in the market. Data entering the market and relating to a stock's security will possibly result in a new price shift in equilibrium (Borgards & Czudaj, 2020). If the market reacts quickly and accurately to incoming information and immediately forms an original equilibrium price, this market condition is an efficient market (Ntim et al., 2015).

Research related to the Efficient Market Hypothesis has been conducted several times by researchers in the world, such as Ahmar and del Val (2020), to predict the closing price of the stock market in Spain in the short term. The results show that the ARIMA model is the most suitable forecasting method. The results of this forecast are expected to be used to make policies.

Sánchez-Granero et al. (2020) tested the Efficient Market Hypothesis on stock exchanges in Latin America by using the statistical arbitration technique known as Pairs Trading. The sample used in this study was shared in Nasdaq, 65 shares in Argentina, Brazil, and Chile, 21 stocks in Brazil, and 28 shares in Chile. The result is an Efficient Market Hypothesis theory of weak form accepted. Arbitration opportunity is not available because the stock price fully reflects all historical information available.

Agustin (2019) tested market efficiency in a weak form on the Indonesia Stock Exchange. The test results show that the Indonesian market proved efficient in a soft way during the study period. With the Indonesian market proven to be competent in a weak form, investors must react quickly in the use of information using fundamental analysis and seek renewal of market conditions by accessing news from digital media.

Malini (2019) tested the Efficient Market Hypothesis theory on the Indonesian stock exchange with a sample of the LQ 45 index. The test results found that the LQ 45 index is efficient in a weak form. The trading system influences the efficiency of the LQ 45 index on the IDX. The trading system must ensure a fair and transparent system for investors because the stock market follows the news and events that occur at a particular time to make it

dynamic and change volatility.

Rajesh et al. (2015) tested the efficient market hypothesis of weak forms on sectoral indices on the National Stock Exchange in India. This study uses the autocorrelation method to check whether the sectoral index is efficient or not. As a result, the sectoral index listed on the National Stock Exchange has not been proven to be productive in a weak form.

Qin and Singal (2015) examine whether there is an effect between stock price efficiency and indexing. The sample used in this study is the S&P 500 index and stocks not included in the S&P 500. The methods used include descriptive statistics, PEAD Analysis, Random Walk, Cross-Sectional Analysis. The results show that indexing reduces the level of efficiency of stock prices. Stocks that have a higher index level have less informative prices.

Phan and Zhou (2014) examined the efficiency of weak form markets in developing markets with stock exchanges in the country of Vietnam being the research sample. The methods used in this study include descriptive statistics, autocorrelation, runs tests, variance ratio test. The experiment results found that the random walk hypothesis was rejected even though it allowed a random walk in the third cycle. Researchers concluded that during ten years of operation, the efficiency of the Vietnam stock exchange increased significantly.

Dong et al. (2013) tested the Efficient Market Hypothesis theory on 37 of the most influential stock exchanges in the world, two crude oil prices, gold prices, and four big-money markets in America. This study uses the Granger Causality method. As a result, all indices studied indicate that all are efficient in a weak form so that there should be no global market leaders in the stock market.

Guidi and Gupta (2013) tested the Efficient Market Hypothesis theory on the ASEAN stock exchange using a univariate or multivariate variance ratio test. Stock exchanges used as samples for research are stock exchanges in Indonesia, Singapore, Malaysia, Thailand, the Philippines, and Vietnam. The results of this study are that stock exchanges in Indonesia, Malaysia, the Philippines, and Vietnam are inefficient in their weak form. Another case with Singapore and Thailand are found to be efficient in an inadequate way.

Sewell (2012) tested the Efficient Market Hypothesis theory on the Dow Jones Industrial Average using four analytical tools, namely autocorrelation, runs test, long memory, and investment newsletter. The autocorrelation test results show that the Dow Jones Industrial Average

is inefficient monthly and annual while efficient in daily and weekly data. The runs test shows that the daily and weekly data indicate that the data is not suitable. In long memory, shows that the annual return is less efficient.

Hamid et al. (2010) tested the efficiency of weak form markets in the Asia Pacific market, including Pakistan, India, Sri Lanka, China, Korea, Hong Kong, Indonesia, Malaysia, the Philippines, Singapore, Thailand, Taiwan, Japan, and Australia. The methods used in this study are descriptive statistics, autocorrelation, runs tests, unit root, and variance ratio. The result is that none of the countries' exchanges has been proven to be efficient in a weak form.

H₁: *Sectoral stock index follows a random walk*

H₂: *There is a relationship between changes in the current monthly stock price with the previous one*

3. RESEARCH METHOD

This study uses monthly data on stock price indexes in each sector on the Indonesia Stock Exchange from February 1996 to March 2020. This year was taken from the initiation of the Jakarta Stock Industrial Classification (JASICA). The selection of each sector index as research objects is based on the Jakarta Stock Industrial Classification (JASICA) classification. There are nine sectors included in the JASICA classification, namely, the agricultural sector (JKAGRI), the mining sector (JKMING), the basic and chemical industry sector (JKBIND), the various industry sectors (JKMISC), the consumer goods sector (JKCONS), the property, real estate, and building construction sector (JKPROP), the infrastructure, utilities, and transportation sector (JKINFA), the financial sector (JKFINA), the trade, services, and investment sectors (JKTRAD).

This research uses several methods to answer the research objectives. To test the Efficient Market Hypothesis theory, the weak form of the researcher uses a variance ratio (Phan & Zhou 2014).

$$VR(j) = \frac{\frac{1}{nq-1} \sum_{t=1}^{nq} \left(P_t - P_{t-q} - \frac{1}{nq} (P_{nq} - P_0) \right)^2}{\sigma_a^2}$$

VR(j) is the variance ratio of j difference, $\sigma_b^2(q)$ is the scale of the variance of j difference, σ_a^2 is the variance of the first differentiation, and p is the closing price. Furthermore, forecasting in this study uses the Autoregressive Conditional Heteroskedasticity (ARCH) method. The variance of time series residual data are not only influenced by the independent variable, but also by the residual value of the variable under study.

$$Y_t = \beta_0 + \beta_1 X_{1t} + \varepsilon_t \quad (2)$$

$$\sigma_{\varepsilon_t}^2 = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 \quad (3)$$

Where Y is the dependent variable, X is the independent variable, ε is a residual, $\sigma_{\varepsilon_t}^2$ is residual α_1 . ε_{t-1}^2 is the ARCH component.

4. DATA ANALYSIS AND DISCUSSION

Test Variance Ratio (VR) of stock prices to the nine industry sector indices to answer the Efficient Market Hypothesis. VR is calculated for intervals (j) from observations 2, 4, 8, and 16. The result of VR (j) > 1 implies a series of positive correlations, and VR (j) < 1 presupposes a set of negative relationships. Based on table 1, the results show that VR testing for intervals of 2, 4, 8, and 16 where the value of VR \neq 1 so that the data does not follow a random walk means that the shares of each industry sector are inefficient in the weak form.

Table 1. Variance ratio test results

Variable	Period = J	2	4	8	16
JKAGRI	VR(j)	0.6284	0.2646	0.1411	0.0716
JKBIND	VR(j)	0.6952	0.3098	0.1787	0.0852
JKCONS	VR(j)	0.6741	0.2865	0.1618	0.0885
JKFINA	VR(j)	0.6163	0.2809	0.1449	0.0816
JKINFA	VR(j)	0.5673	0.2192	0.1303	0.0679
JKMING	VR(j)	0.5751	0.2685	0.1621	0.0899
JKMISC	VR(j)	0.5724	0.3082	0.1429	0.0853
JKPROP	VR(j)	0.6245	0.3152	0.1631	0.0976
JKTRAD	VR(j)	0.7296	0.3761	0.1835	0.1099

Table 2 shows that the unit root test results indicate that the ninth index data is stationary. This is indicated by the statistical value of augmented dickey fuller (ADF) test, which is smaller than the McKinnon

critical level, at a predetermined critical value, which is 1%, 5%, or 10%, then H_0 is rejected which indicates that the data has been stationary.

Table 2. Augmented Dickey-Fuller test results

Variable	t-statistic				Prob.
	ADF	Critical Value			
		1%	5%	10%	
JKAGRI	-13.2089	-3.45291	-2.8714	-2.5721	0.0000
JKBIND	-12.2331	-3.45291	-2.8714	-2.5721	0.0000
JKCONS	-14.0009	-3.45291	-2.8714	-2.5721	0.0000
JKFINA	-14.3076	-3.45291	-2.8714	-2.5721	0.0000
JKINFA	-13.9391	-3.45291	-2.8714	-2.5721	0.0000
JKMISC	-14.0491	-3.45283	-2.8713	-2.5721	0.0000
JKMING	-14.2108	-3.45283	-2.8713	-2.5721	0.0000
JKPROP	-13.4625	-3.45283	-2.8713	-2.5721	0.0000
JKTRAD	-12.2926	-3.45283	-2.8713	-2.5721	0.0000

Table 3 is the best Autoregressive Integrated Moving Average (ARIMA) forecasting model based on the lowest Akaike Info Criterion (AIC) and Schwarz Information Criterion (SIC) values for each model parameter. To determine whether the temporary model that has been identified is suitable, it is necessary to estimate the parameters of the model by looking at the value of AIC and SIC. Models of the

actual return data index JKAGRI, JKBIND, JKCONS, JKFINA, JKINFA, JKMISC, JKMING, JKPROP and JKTRAD that will be estimated are ARMA (1.1), ARMA (1.2), ARMA (2.1), and ARMA (2.2). How to read from ARMA modeling (2.1) in which 2 is Autoregressive (AR), while 1 is Moving Average (MA), and so on.

Table 3. ARIMA modeling

Variabel	Parameter	AIC	SIC
JKAGRI	ARMA(2.1)	-1.5019	-1.4512
JKBIND	ARMA(2.1)	-2.0346	-1.9839
JKCONS	ARMA(2.1)	-2.2675	-2.2169
JKFINA	ARMA(2.1)	-2.0973	-2.0467
JKINFA	ARMA(2.1)	-1.8129	-1.7623
JKMING	ARMA(1.1)	-1.5635	-1.5129
JKMISC	ARMA(1.2)	-2.1036	-2.0529
JKPROP	ARMA(1.1)	-1.6556	-1.6049
JKTRAD	ARMA(1.1)	-2.0957	-2.0451

Based on table 4, the results of the ninth test of the research index show that for the JKBIND and JKFINA index, the probability value is more significant than α (5%), meaning that both indexes are homoscedasticity or there is no ARCH effect. Whereas for the other seven indexes, the probability

value is smaller than α (5%). It means that the other seven indexes are heteroscedasticity, or there is an ARCH effect on the forecasting model. The JKAGRI, JKCONS, JKINFA, JKMING, JKMISC, JKPROP, and JKTRAD indices can be continued with the ARCH model.

Table 4. Testing results of the ARCH effect

Variable	Obs*Squared	Prob. Chi-Square	Information
JKAGRI	24.5169	0.0000	ARCH Effect
JKBIND	3.5779	0.0586	No ARCH effect
JKCONS	9.4223	0.0021	ARCH Effect
JKFINA	0.4309	0.5115	No ARCH effect
JKINFA	23.059	0.0000	ARCH Effect
JMING	7.5776	0.0059	ARCH Effect
JKMISC	11.3785	0.0007	ARCH Effect
JKPROP	43.63432	0.0000	ARCH Effect
JKTRAD	19.57811	0.0000	ARCH Effect

From the forecasting results (Table 5), the agricultural sector (JKAGRI) index is predicted to experience a growth rate of return of 0.66 percent at the beginning of the forecasting period. The JKAGRI index recorded the highest growth rate of return in May 2020 at 1.75 percent. For the next forecasting period, namely, from August 2020 to December 2021, the JKAGRI index return rate's growth was stagnant at 0.58 percent.

The consumer goods sector (JKCONS) index is predicted to experience a growth rate of return of 0.05 percent at the beginning of the forecasting period. The

JKCONS index recorded the highest growth of 1.00 percent in July 2020 and stagnated until December 2021. The financial sector (JKIFNA) index is predicted to experience a contraction of growth at -0.86 percent at the beginning of the forecasting period. In the following month, namely, in May 2020, the JKINFA index recorded a positive growth of 1.30 percent while being the highest during the forecast period. In August 2020 to December 2021, the growth of the JKINFA index return rate was stagnant at 0.75 percent.

Table 5. Industrial sector forecasting results

Date	JKAGRI	JKCONS	JKINFA	JKMISC	JKMING	JKPROP	JKTRAD
Apr-20	0.66%	0.05%	-0.86%	-3.70%	-0.95%	-3.67%	-1.66%
May-20	1.75%	0.85%	1.30%	-0.47%	1.17%	-2.08%	0.01%
Jun-20	0.57%	0.98%	0.80%	0.80%	0.85%	-1.07%	0.13%
Jul-20	0.51%	1.00%	0.73%	1.01%	0.90%	-0.43%	0.14%
Aug-20	0.58%	1.00%	0.75%	1.04%	0.89%	-0.02%	0.14%
Sep-20	0.58%	1.00%	0.75%	1.05%	0.89%	0.24%	0.14%
Oct-20	0.58%	1.00%	0.75%	1.05%	0.89%	0.41%	0.14%
Nov-20	0.58%	1.00%	0.75%	1.05%	0.89%	0.51%	0.14%
Dec-20	0.58%	1.00%	0.75%	1.05%	0.89%	0.58%	0.14%
Jan-21	0.58%	1.00%	0.75%	1.05%	0.89%	0.62%	0.14%
Feb-21	0.58%	1.00%	0.75%	1.05%	0.89%	0.65%	0.14%
Mar-21	0.58%	1.00%	0.75%	1.05%	0.89%	0.67%	0.14%
Apr-21	0.58%	1.00%	0.75%	1.05%	0.89%	0.68%	0.14%
May-21	0.58%	1.00%	0.75%	1.05%	0.89%	0.68%	0.14%
Jun-21	0.58%	1.00%	0.75%	1.05%	0.89%	0.69%	0.14%
Jul-21	0.58%	1.00%	0.75%	1.05%	0.89%	0.69%	0.14%
Aug-21	0.58%	1.00%	0.75%	1.05%	0.89%	0.69%	0.14%
Sep-21	0.58%	1.00%	0.75%	1.05%	0.89%	0.69%	0.14%
Oct-21	0.58%	1.00%	0.75%	1.05%	0.89%	0.69%	0.14%
Nov-21	0.58%	1.00%	0.75%	1.05%	0.89%	0.69%	0.14%
Dec-21	0.58%	1.00%	0.75%	1.05%	0.89%	0.69%	0.14%

The various industry sectors (JKMISC) index is predicted to experience a contraction of growth at -3.70 percent at the beginning of the study period and continue in May 2020 at -0.47 percent. In the following months, the JKMISC index recorded a positive growth rate of return. The JKMISC index growth was at 0.80 percent in June 2010 and stagnant at 1.05 percent in September 2020 to December 2021. The mining sector (JKMING) index is predicted to experience a contraction of growth at -0.95 percent at the beginning of the study. In May 2020, the JKMING index experienced positive growth and was among the highest during the forecast period, which was 1.17 percent. In July 2020 to December 2021, the growth of the JKMING index return stagnant was 0.89 percent.

The property, real estate, and building construction sector (JKPROP) index is the only index experiencing the most extended contraction period during the forecasting period recorded from April 2020 to August 2020. The JKPROP index recorded negative growth of -3.67 percent in April 2020 after continuing to record negative growth. The JPROP index was able to record growth positively in September 2020 and continues to fluctuate. In July 2021, the growth of the JKPROP Index return rate was stagnant at 0.69 percent. The trade, services, and investment sectors (JKTRAD) index is predicted to experience a contraction of growth of -1.66 percent at the beginning of the study period. In May 2020 the JKTRAD index recorded a positive growth of 0.01 percent, in the following months, from July 2020 to December 2021, the JKTRAD index's growth experienced a stagnant growth of 0.14 percent. These results make the JKTRAD index the index with the lowest growth rate.

This finding is in line with Agustin (2019), Andrianto and Mirza (2016), Guidi and Gupta (2013), Hamid *et al.*, (2010), and Malini (2019) stating that the Indonesia Stock Exchange was inefficient in its weak form. Indonesia is a unique market at an early stage of development (Sharma *et al.*, 2019). Many companies in Indonesia use capital expenditure to boost their market position. Capital expenditure is also a significant predictor in predicting stock returns on the stock market (Li *et al.*, 2020). The market character also gives great attention to local and foreign investors (Kim & Yi, 2015; Piccotti & Schreiber 2020). In an uncertain situation, foreign investors usually leave the domestic stock market and switch to safe investment instruments (Guzman *et al.*, 2018). All issuers should be proactive in conducting business activities so that the national economic curve will continue to grow positively, and the economy can accelerate faster (Zhao *et al.*, 2020). Foreign

investor confidence needs to be maintained to encourage investment in the capital market (Griebeler & Wagner, 2017). That could have an impact on the flow of foreign funds to re-enter Indonesia.

5. CONCLUSION, IMPLICATION, SUGGESTION, AND LIMITATIONS

The results of variance ratio testing show that the stock price returns of each industry sector in the Indonesia Stock Exchange do not follow a random walk, which means there is no relationship with the previous stock price. All the industrial areas studied are inefficient in a weak form. Investors, especially domestic investors, can exploit the Indonesian market's inefficiency because local investors in the Indonesian market have the advantage of information over foreign investors.

The best ARIMA modeling technique results are then used to find the best model on the ARCH modeling technique, which has been tested before an ARCH Effect. Then proceed with forecasting, where almost all indices experience a contraction of growth at the beginning of the forecasting period. Noted, only the JKAGRI index and JKCONS experienced positive return growth. The stakeholders are expected to be more active in the market by frequently buying and selling securities because the market is proven inefficient, and the market can be defeated.

The efficiency of emerging stock markets has become a unique attraction for national and international investors and policymakers. This study's results imply that an investor who wants to identify assets can be done by looking at the share prices of each sector in the past. An investor can also see the unique characteristics of each sectoral stock. This study's results are also important for policymakers who can help develop policies to improve Indonesia's market efficiency to make the market more attractive to investors. Investment managers also benefit from the results of this study by understanding the functions of stocks in each sector to carry out portfolio diversification strategies.

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